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## FOREST PEST LEAFLET 70

*Nantucket Pine Tip Moth*Harry O. Yates III<sup>1</sup> and Raymond H. Beal<sup>2</sup>

The Nantucket pine tip moth, *Rhyacionia frustrana* (Comstock), is considered one of the more important forest insect pests in the Eastern United States. Its range extends from Massachusetts into Florida and west into Texas (fig. 1). The species also occurs

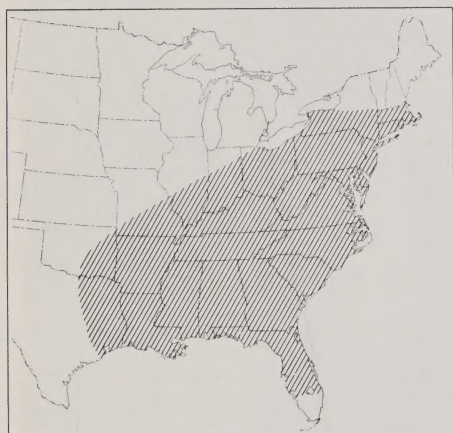


Figure 1.—Distribution of the Nantucket pine tip moth within the United States.

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in Canada, having been reported over a wide area in Ontario.

Attack by the Nantucket pine tip moth is most damaging to plantations of susceptible species of pine and to wild seedlings in open areas. This insect poses an ever-increasing problem because of existing trends in forestry that favor the establishment of large areas of pine plantations. In such areas, Nantucket pine tip moth damage may be very severe.

Two other closely related species of *Rhyacionia* may be found in this same geographic area and are often found infesting the same trees as the Nantucket pine tip moth. These are the pitch-pine tip moth, *R. rigidana* (Fernald), and the subtropical pine tip moth, *R. subtropica* Miller. The pitch-pine tip moth is the most prevalent species and is difficult to distinguish from the Nantucket pine tip moth. The range of the subtropical pine tip moth is restricted to Florida and the southern parts of Georgia, Alabama, and Mississippi.

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## Hosts

Nearly all species of native and exotic pines that grow in the eastern half of the United States are attacked by the Nantucket pine tip moth. The only exceptions are longleaf pine and eastern white

pine. Slash pine, although occasionally attacked, is quite resistant.

The subtropical pine tip moth, unlike the other two tip moth species, prefers longleaf and slash pines.



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Figure 2.—Loblolly pine severely injured by the Nantucket pine tip moth. Note that slash pine in background is completely free of tip moth injury.



Certain pine species are preferred by the Nantucket pine tip moth in different parts of the United States. In the South and Southeast the favored hosts are loblolly and shortleaf pines. Pitch, Virginia, and Scotch pines appear to be favored in New England and the Middle Atlantic States. Shortleaf pine is favored in the Central States.

### Evidence of Infestation

Early feeding is indicated by small, delicate webs constructed by the young larvae. These webs are found in the axil formed by the developing needles and the stem. Later, webbing at the shoot tips and accumulation of resin and fecal material within this webbing are a more prominent indication of infestation. In a short time the tips of infested shoots die and turn brown, becoming quite noticeable from a distance.

### Injury

The Nantucket pine tip moth injures the growing shoots of young pines. The larva bores into and feeds on inner tissues of the buds and shoots. Such feeding severs the conductive tissue and causes death of the shoot (fig. 2).

In severe and prolonged infestations, trees may be killed as a result of larval activity, but normally the loss or retardation of height growth and deformation of the main stem are the most important economic injuries. In some areas, every shoot may be killed as it develops; consequently, at

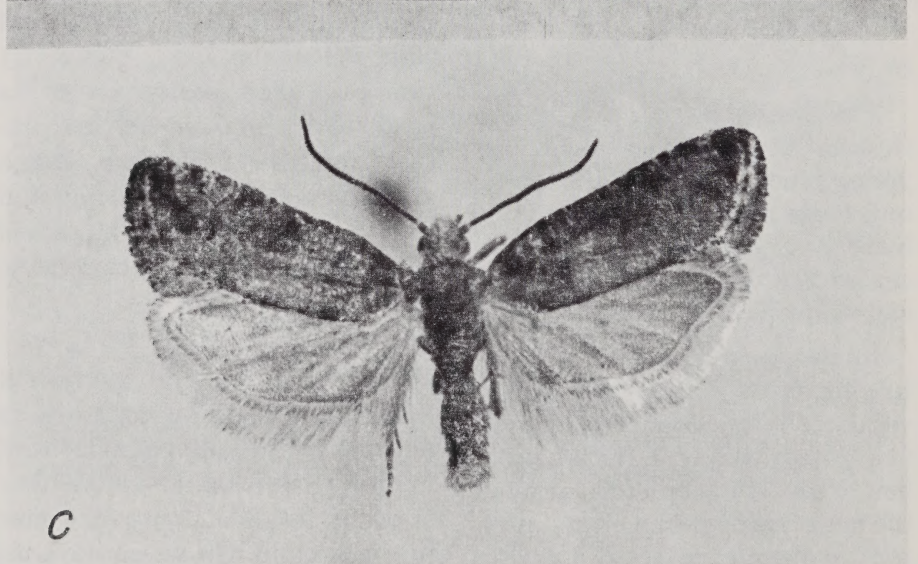
the end of the growing season, little or no height has been added to the trees. Where tree vigor is poor, deformations such as stem crooking and forking may also occur. In seed orchards and seed production areas, cone and seed production may be reduced through destruction of shoots containing embryonic flower buds.

### Description

The egg is slightly convex and approximately  $1/32$  inch in diameter. When laid, it is an opaque white, but it turns yellow to medium orange as it matures. The very small, young larva is cream colored with a black head; the mature larva (fig. 3, *A*) is light brown to orange and approximately  $3/8$  inch long. The pupa (fig. 3, *B*) is light to dark brown and approximately  $1/4$  inch long. Just before the adult emerges, variations in wing coloration can be detected through the pupal skin. When the adult (fig. 3, *C*) emerges, gray scales cover its head, body, and appendages, except for the forewings, which are covered with brick-red and copper-colored patches separated by irregular bands of gray scales.

### Life History

In the United States, Nantucket pine tip moths overwinter as pupae within damaged shoots of the host trees (fig. 3, *B*). Farther north, in Ontario, they overwinter in the ground. On warm days, as early as February in the Deep South, adult moths emerge, mate,



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Figure 3.—*A*, Injured shoot dissected to expose mature larvae (arrows). *B*, Injured shoot dissected to expose pupae (arrows). *C*, Adult Nantucket pine tip moths have wingspan of about  $\frac{1}{2}$  inch.



and lay eggs on the current season's new, succulent growth. Very often early emerging moths appear before new growth has started, and eggs are laid on old needles and shoots. The egg incubation period may extend as long as 30 days if cool weather follows egg laying in the spring, but for generations later in the summer it lasts 5 to 10 days.

Newly hatched larvae may be found feeding on the surface of new growth and causing shallow injuries or boring into the needle fascicles. Later the larvae migrate to the shoot tips, construct a protective web at the base of the buds, and begin boring into the bud or stem tissue. Feeding continues inside these tissues until larvae are fully grown, a period lasting 3 to 4 weeks. Pupation occurs within the cavities formed by the larvae.

This process, depending on geographic location and weather conditions, is repeated from one to five times during a single growing season. One generation occurs in Ontario. Two generations occur in the northern part of the United States. South of Pennsylvania and into the Midwest, three generations occur as far south as North Carolina and Tennessee. States farther south have four generations per season, with the exception of parts of the Gulf Coast area where five generations may occur.

### Natural Control

More than 30 known species of parasites attack the Nantucket

pine tip moth. Several predatory insects and birds also attack this pest. Low winter temperature in the northern part of the range can cause the death of overwintering pupae.

### Direct Control

Large-scale control of the moth with insecticides usually is not recommended because of the high cost of application. Control may be justified, however, in high-value areas, such as seed orchards or forest tree nurseries, where power sprayers can be used.

A 0.12-percent dimethoate water emulsion is effective when the tree terminals are drench-sprayed. One-gallon and 100-gallon lots of the 0.12-percent emulsion can be prepared from 50-percent dimethoate emulsifiable concentrate (containing 4 pounds of dimethoate per gallon). Add 2 teaspoons of the concentrate to 1 gallon of water. Or, add 1 quart of the concentrate to enough water to make 100 gallons of spray.

To obtain control throughout the season, spraying may be necessary for each generation of the moth. The spray should be directed at the young larvae, which feed on the exterior of the shoot for a period of several days. Larvae begin to hatch 5 to 10 days after the peak of adult emergence. When cool weather follows peak adult emergence in early spring, spraying should be deferred for about 14 days.

Airplane spraying of plantations has produced erratic results;

additional studies are needed before this method of control can be recommended.

### Indirect Control

Certain cultural practices may be employed to reduce the damage done by this insect. Highly susceptible species of pine should be planted only on sites to which they are well adapted. On poorer sites, species of pine resistant to Nantucket pine tip moth should be substituted if possible. Such practices as close spacing and planting under an overstory may help reduce moth populations and subsequent injury.

### Pesticide Precautions

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key—out of the reach of children and animals—and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or when they may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed.

In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

**WARNING:** Recommendations for use of pesticides are reviewed regularly. The registrations on all suggested uses of pesticides in this publication were in effect at press time. Check with your county agricultural agent, State agricultural experiment station, or local forester to determine if these recommendations are still current.

### References

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